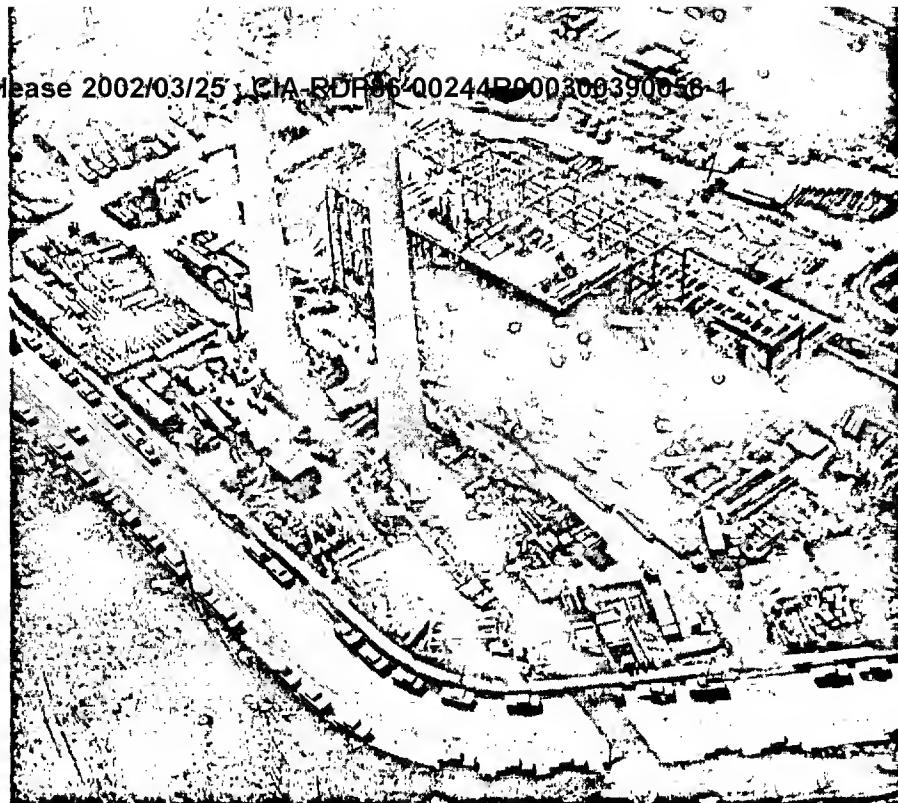


CHICAGO incinerator will cut costs by selling steam.

STEAM-producing plant will be one of biggest in western hemisphere.



Chicago and London Take the

Like sausage makers employing every part of the hog but the squeal, incinerator owners in Chicago and London are trying to make the most out of garbage. And both are doing it without much squealing from the public.

Chicago's Public Works Department is building a basically European incinerator that will produce salable steam. And the Greater London Council has one under construction that will produce electricity. Neither agency expects to make municipal garbage disposal a profitable business, but both expect to take some of the financial sting out of handling the growing solid waste pile.

• **In Chicago**—With little fanfare, Chicago is building one of the largest incinerators in the western hemisphere. When finished late next year, the \$20-million plant will burn 1,600 tons per day (tpd), or about 20% of the total solid waste generated in the city daily. As a byproduct, the plant will produce 440,000 lb of steam per hour. About 200,000 lb per hour will be sold, the rest used to run various plant equipment.

Unlike incinerators that Americans have come to know and dislike, Chicago's Northwest Incinerator is guaranteed by city officials to be free of dust, odors, vermin and nuisance. And, except for its dual 250-ft-high brick stacks, it resembles a group of modern office buildings.

The plant's design is not new. The

there is a similar one with a 360-tpd capacity in Newport News, Va. And the design has been a European standby for several years. But it is the largest of its type in the U.S. and is expected to attract considerable interest from municipal officials when it opens.

The key feature, designed by I.B.W. Martin Co. of Munich, Germany, is a water wall circulating cooling water through welded tubes that form the wall of the firebox. This wall prevents slag buildup often found on the walls of refractory furnaces and thus eliminates frequent and extended shutdowns required to clean the walls.

Commissioner of Public Works Milton Pikarsky estimates that the Northwest Incinerator will have to be shut down for cleaning only once a year and then only for a weekend.

The water wall also serves as a feed-water heater for a steam-boiler. Pikarsky says it is too early to say exactly how much income the steam will generate, but current thinking is that it will produce about \$2.10 per ton of solid waste burned. He also expects to get about 25 cents a ton from metal salvage. According to Pikarsky, with these cost reductions, the plant will cost about \$5 a ton to operate, including a 20-year capital amortization of \$3.40 a ton and operating costs of \$3.95 a ton.

Another advantage to the water wall, says Pikarsky, is that the temperature (2,000°F) and volume of the gases inside the furnace will be lower than that in

refractory furnaces. This allows the use of an electrostatic precipitator for removal of fly ash instead of the mechanical removal equipment necessary in hot furnaces.

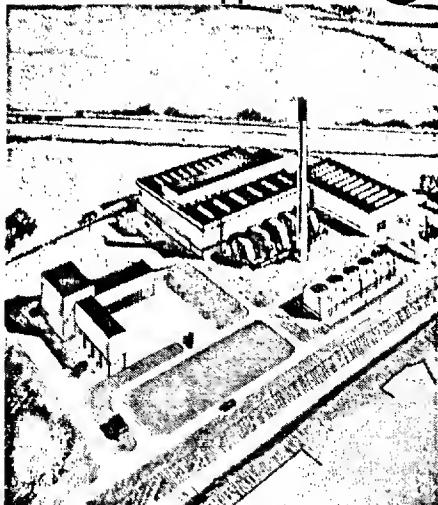
The choice of an incinerator over rail haul or landfill was easy, says Pikarsky. "No one has come up with a proposal that would cost less than an incinerator," he notes.

"The problems of landfill and rail haul would be politically sensitive and the city would have to be sure that any material would not be deleterious to the environment."

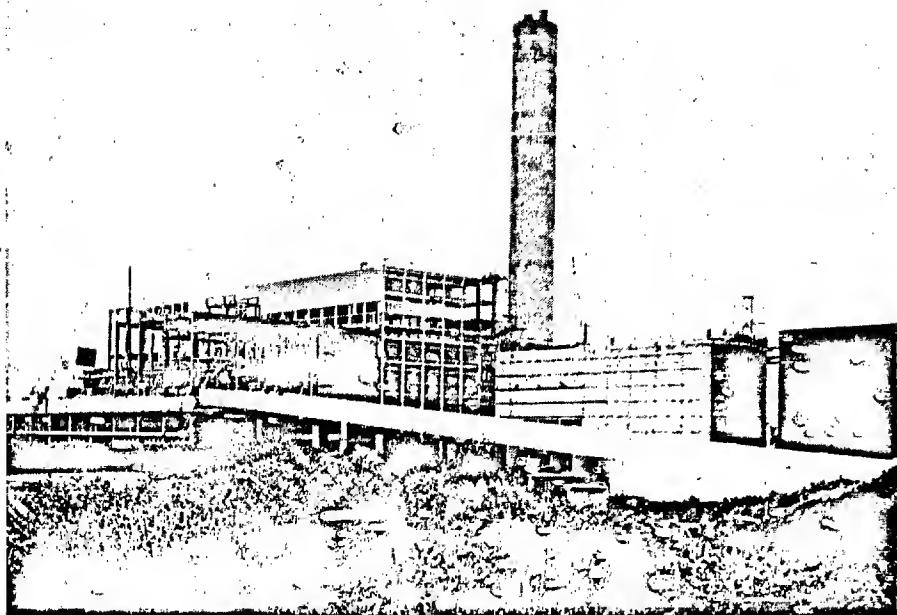
What could have been a difficult hurdle for the plant, acceptance by its neighbors, was easily overcome. The plant is in an area zoned for light industry and residences. Pikarsky says that the city could have sidestepped the zoning ordinances, but preferred to go through the normal procedure to guarantee acceptance.

• **Town meeting approach**—The department invited local residents, government representatives and the local press to a meeting of the Chicago Zoning Commission where it made its presentation. The department was able to field all questions, and the local citizenry left satisfied that the incinerator would prove a good neighbor.

The next-door incinerator will have a battery of four 400-tpd furnaces connected by a 10,000-cu-yd storage bin containing 1-2 days' refuse. Trucks will



LONDON incinerator will cut costs by electricity sales.



COUNCIL is building plant on a sewage plant sludge bed.

Financial Sting Out of Garbage

unload into the bin and wastes will be collected by traveling cranes and dumped into charging bins.

Bulky material will be fed into a shredder driven by some of the plant's steam output. Ferrous metals will be magnetically separated after shredding, and remaining waste will go back into the bins.

Hydraulic rams will push the waste onto the furnace's inclined, reverse action grates. As the waste tumbles down the grate, alternate rows of teeth move back and forth, pushing burning waste under the newly added waste. The three stages of incineration, drying, ignition, and combustion, thus occur in close proximity to each other throughout the entire length of the grate.

The degree of burnout on the grates is 96%. Residue discharges into an air-sealed water bath and travels from there through a rotary screen that removes any particles larger than 2 in. Then the residue will be loaded in trucks and sent to landfills.

Burning is facilitated by two forced-draft fans also driven by plant-produced steam. Air for the underfed fan is drawn from outside the plant and from dumping and storage bins. The negative pressure created assures that no odors will escape from the plant.

• Garbage on sludge—Britain's largest incinerator, at Edmonton in northeast London, will be fired up at about the same time as Chicago's. The \$24-million

plant will burn wastes for about \$5 a ton. Income the Greater London Council expects to receive by selling electricity generated in the plant will reduce that figure.

The council feels that incineration is the coming method of disposing of the area's annual production of 3 million tons of waste. Right now, most is tipped [dumped], used for land reclamation or salvaged. According to an official of the council's public health engineering department, "Sooner or later we are going to have difficulty finding tips [dumps]. And anyway, taking the rubbish farther and farther away is becoming more expensive." He is also concerned about pollution occurring when rain water leaches through the waste and into the ground water.

The Edmonton plant is a big one, covering 27.5 acres. But, by careful landscaping and siting, the council thinks it will be inconspicuous. And they are sure it will not bother the neighbor, a sewage treatment plant. Contractor Richard Costain Civil Engineering Ltd., of London, had to remove 50,000 cu yd of wet sludge before it could begin what it says is one of the deepest unsupported excavations in London. The 45-ft-deep foundation hole measures 560 x 320 ft.

The incinerator will handle 1,500 tpd and has a peak capacity of 1,900 tpd. Trucks will dump into storage bins where overhead grab cranes will load

above the cranes will draw off dust-laden air and push it through wet dust extractors.

The key element in the Edmonton plant is the power plant. Steam from boilers will be fed into three of the plant's four 12,500-kw turbogenerators. The fourth generator will be a standby unit. In addition, two 2,500-kw generators will supply power for the plant's electrical equipment.

The Eastern Electricity Board, of London, will buy the power. The council expects to net about \$1 million from the sale of power during the first year's operation.

Because of the day-to-day variation in the heat value of the waste material, a turbine and steam control system will be installed to control the pressure in the steam mains without regulating the boiler rate. A dump condenser will absorb excess steam. Cooling water for the condenser will come from the adjacent sewage treatment plant.

After the furnace has wrung all the value out of the waste, only 10% of its bulk will remain. The residue and ash will pass through a water-filled quenching pit before landing on a conveyor that takes it to a special handling building.

There, the material will be sorted by coarse screening, breaking and magnetic separation. Ferrous metals will be sold as scrap and other residue will be used as landfill. Clinker will be sold to high-temperature foundries.